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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,590	06/06/2005	Zhen Liu	YOR920020238US1	5479

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EXAMINER	
CEHIC, KENAN	

ART UNIT	PAPER NUMBER
2416	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,590	LIU ET AL.	
	Examiner	Art Unit	
	KENAN CEHIC	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 11-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For claim 11, it is not clear how the limitation "based at least in part on respective ener~y reserves associated with affected nodes and an amount of ener~y required to move packets between the affected nodes in a manner that substantially minimizes power dissipation at the affected nodes " is in relation with the rest of the claim (since the word "based" is used)/ what the meaning of the limitation is. It appears that applicant was trying to claim that the routing is based on both the queue heights and on the energy required, however the claim does not explicitly state that (the claim does not that it is "routing....such as....*and* based at least in part").

Dependent claims are rejected on the above basis.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claim 11, 12, 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (WO 01/47181) in view of Muthukrishnan et al. (US 6,377,544), Bechtolsheim et al (US 7,215,641) and Sang et al (US 6,401,147).

For claim 11, Nakagawa discloses a method for routing packets in a distributed network (see fig 3 and 4) including a plurality of nodes (see fig 3 and 4; node and page 9 3rd para. "terminals 30-37), the nodes being coupled via links (see fig 3 and 4 "Established wireless link"), the method comprising the steps of: injecting a signal into the distributed network at a corresponding source node (see page 3 2nd-4th para. "each node being capable of transmitting signals to and receiving signals...routing means for routing communication..."), pushing the signals in the distributed network such that packets are moved based at least in part on respective energy reserves associated with affected nodes and an amount of energy required to move packets between the affected nodes (see page 9 3rd para through page 10. "account is taken both available energy at each node and expected power consumption of each node to support each proposed route…minimise power consumption….minimises power consumption…allows for increased battery life "; page 8 2nd para. " a required transmission power to support satisfactory

communication…"; page 6-7 1st para."report…terminal's amount of stored enerrgy available for use in supporting the requested link and current movement vector…preserving energy reserves in devices having limited available energy" and page 2nd para. "amount of energy available…power consumption…expected minimum battery lifetimes" and page 12 claims 9,12 "power required for transmission of signals to those other nodes"), in a manner that substantially minimizes power dissipation at the affected nodes in order to prevent exhaustion of any energy reserve associated with an affected node (see page 9 3rd para through page 10. "account is taken both available energy at each node and expected power consumption of each node to support each proposed route…minimise power consumption….minimises power consumption…allows for increased battery life "; page 8 2nd para. " a required transmission power to support satisfactory communication…"; page 6-7 1st para."report…terminal's amount of stored enerrgy available for use in supporting the requested link and current movement vector…preserving energy reserves in devices having limited available energy" and page 2nd para. "amount of energy available…power consumption…expected minimum battery lifetimes" and page 12 claims 9,12 "power required for transmission of signals to those other nodes");

For claim 12, Nakagawa discloses wherein the distributed network is a mobile ad-hoc network (see fig 3and 4; page 4 "a distributed or ad-hoc communication network"), and further wherein the node and at least one neighboring node (see fig 3 and 4; node) communicate (see page 3 2nd-4th para. "each node being capable of transmitting signals to and receiving signals...routing means for routing communication...") over a wireless link

(see page 4 3rd para. Through page 5 "wireless signals…radio signals…mobile phone" and fig 3 and 4 "Established wireless link").

For claim 14, Nakagawa discloses substantially maximizing a time period prior to exhaustion of an energy reserve associated with an node of the distributed network (see page 9 3rd para through page 10. "account is taken both available energy at each node and expected power consumption of each node to support each proposed route…minimise power consumption….minimises power consumption…allows for increased battery life "; page 8 2nd para. " a required transmission power to support satisfactory communication…"; page 6-7 1st para."report…terminal's amount of stored enerrgy available for use in supporting the requested link and current movement vector…preserving energy reserves in devices having limited available energy" and page 2nd para. "amount of energy available…power consumption…expected minimum battery lifetimes" and page 12 claims 9,12 "power required for transmission of signals to those other nodes").

Nakagawa is silent about:

For claim 11, injecting a packet flow (col 4 lines 30-60 "flow is added at a source"), the nodes having queues associated with the links ; wherein the packet flow is stored in an overflow buffer of the source node in response to a height of at least a given queue of the source node exceeding a threshold; equalizing the queues at each node of the distributed network wherein an integer number of packets in each queue is maintained; pushing the packet flow in the distributed network such that packets are moved from a queue with a

higher height to a queue with a lower height, and absorbing the packet flow at a corresponding sink node such that heights of queues at the sink node are set to zero.

For claim 14, wherein the injecting, equalizing, pushing and absorbing steps are performed for a number of rounds such that throughput requirements are substantially satisfied.

Muthukrishnan from the same or similar field of endeavor discloses the following features:

For claim 11, Muthukrishnan injecting a packet flow (col 4 lines 30-60 "flow is added at a source"), into the distributed network (see Fig 1; 10,110 and col 4 lines 30-60 "communication system"); the nodes (see Fig 1; 10,110 and col 4 lines 35-60 "plurality of switches including a source and a sink") having queues associated with the links (see Fig 1; queue and col 4 lines 30-60 "links having a pair of queue buffers…queue buffer pairs"), the method comprising the steps of: injecting a packet flow (col 4 lines 30-60 "flow is added at a source equalizing the queues (see col 4 lines 35-60 "the flow is partitioned evenly among the queue buffers of the communication links of each switch….difference between the amount of data in each of the queue buffer pairs" and see col 5 lines 1-30 "amount of flow Fi os ….is routed across each said link such ….is maximized" and col 4 lines 58-67 "is defined as the difference in a amount of data between a pair of queue buffers" and col 6 amount of data that is in queue 20a….minus the amount of data that is in queue 120" and Fig 1; 20a, 120" and col 9 lines 5-25 "larger sending queue of the system transmits to the smaller receiving queue") each node (see col 4 lines 35-60 "the flow is partitioned evenly among the queue buffers of the

communication links of each switch….difference between the amount of data in each of the queue buffer pairs" and see col 5 lines 1-30 "amount of flow Fi os ….is routed across each said link such ….is maximized" and col 4 lines 58-67 "is defined as the difference in a amount of data between a pair of queue buffers" and col 6 amount of data that is in queue 20a….minus the amount of data that is in queue 120" and Fig 1; 20a, 120" and col 9 lines 5-25 "larger sending queue of the system transmits to the smaller receiving queue" and col 7 lines 24-35 "repeated iteratively at each switch…each iteration at each switch") of the distributed network (see Fig 1; 10,110 and col 4 lines 30-60 "communication system"), wherein an integer number of packets in each queue is maintained (see Fig 1; queue and col 4 lines 30-60 "links having a pair of queue buffers…queue buffer pairs" and col 6 lines 35-50 "d units…divided equally among the local queue buffers of the switches" and col 8 lines 5-20 "di units…each switch…difference…amount of data type" and col 8 lines 35-45 "fi units…communicant link e");

; pushing the packet flow (see col 4 lines 35-60 "amount of the flow of the data is routed across each link") in the distributed network (see Fig 1; 10,110 and col 4 lines 30-60 "communication system") such that packets are moved from a queue with a higher height to a queue with a lower height (see col 4 lines 35-60 "the flow is partitioned evenly among the queue buffers of the communication links of each switch….difference between the amount of data in each of the queue buffer pairs" and see col 5 lines 1-30 "amount of flow Fi os ….is routed across each said link such ….is maximized" and col 4 lines 58-67 "is defined as the difference in a amount of data between a pair of queue buffers" and col 6 amount of data that is in queue 20a….minus the amount of data that is

in queue 120" and Fig 1; 20a, 120" and col 9 lines 5-25 "larger sending queue of the system transmits to the smaller receiving queue"); and absorbing the packet flow (see col 4 lines 50-55 "routed data is then removed when it reaches a sink or a destination node") at a corresponding sink node (see col 4 lines 50-55 "routed data is then removed when it reaches a sink or a destination node").

For claim 14, Muthukrishnan discloses wherein the injecting, equalizing, pushing and absorbing steps (see col 4 line 45-60; see col 4 lines 35-60 "the flow is partitioned evenly among the queue buffers of the communication links of each switch….difference between the amount of data in each of the queue buffer pairs" and see col 5 lines 1-30 "amount of flow Fi os ….is routed across each said link such ….is maximized" and col 4 lines 58-67 "is defined as the difference in a amount of data between a pair of queue buffers" and col 6 amount of data that is in queue 20a….minus the amount of data that is in queue 120" and Fig 1; 20a, 120" and col 9 lines 5-25 "larger sending queue of the system transmits to the smaller receiving queue"; see col 4 lines 35-60 "amount of the flow of the data is routed across each link"; col 4 lines 50-55 "routed data is then removed when it reaches a sink or a destination node") are performed for a number of rounds (see col 4 lines 35-60 "amount of the flow of the data is routed across each link"and col 3 lines 55-62 "proceeds in rounds" and col 4 line 45 through col 5 line 30 "This process is iteratively repeated until a maximum flow value is reached…in each switch…" and col 6 line 25-36 "computes and amout of ddata flow to be route …according…the flow that was sent in the previous iteration") such that throughput requirements are substantially satisfied (see col 7 lines 27-35 "satisfactory maximum

flow value is reaches" and col 4 line 45-60 "This process is iteratively repeated until a maximum flow value is reached" and col 6 line 25-36 "computes and amout of ddata flow to be route …according…the flow that was sent in the previous iteration")

Sang from the same or similar field of endeavor discloses the following features:

For claim 11, Sang discloses wherein the packet flow is stored in an overflow buffer of the node in response to a height of at least a given queue of the source node exceeding a threshold (see col 20 lines 3-25 "transferring entries to an overflow storage area if…exceeds the first threshold value…exceeds the second threshold value" and fig 7 ; S710-S720 or fig 8; S810-S822).

For claim 11, Bechtolsheim discloses absorbing the packet flow at a corresponding sink node (see fig 3; 300, 330, 302-340 and fig 4; 460, "Yes" and 410-470) that heights of queues at a sink node are set to zero (see fig 4; 460, "Yes" and 410-470 and col 12 lines 12-25 "stored buffer field...zero...no more packet from the flow remain in a queue)

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Nakagawa by using the features, as taught by Bechtolsheim (7,215,641), Sang et al (US 6,401,147), and Muthukrishnan et al. (US 6,377,544) in order to provide "queue structure and a method of queuing that will satisfy both competing interests of low latency and high capacity, that queues entries to a system with low latency, yet still retains the capacity to handle relatively large amounts of entries when necessary" (see Sang col 2); in order to provide "a scheme to rapidly identify good flows from bad (i.e., the well-behaved flows vs. the non-adapting aggressive flows) on a packet-by-packet basis (see Bechtolsheim col 4); in order to provide a system /method

which determines an optimal flow through a network, in which this determination is speed up / less calculation is required (see Muthukrishnan col 2-4)

3. Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (WO 01/47181), Muthukrishnan et al. (US 6,377,544), Bechtolsheim et al (US 7,215,641) and Sang et al (US 6,401,147) as applied to claim 11 above, further in view of Chuah (US US 7,197,025).

Nakagawa, Muthukrishnan, Bechtolsheim and Sang disclose all the claimed invention as described above.

Nakagawa, Muthukrishnan, Bechtolsheim and Sang are silent about:

For claim 13, node receiving broadcast information from at least one neighboring node pertaining to the height of at least one queue of one neighboring node.

Chuah from the same or similar field of endeavor discloses a communication network with the following features:

For claim 13, Chuah discloses node (see col 36 lines 14-60 "wireless modem") receiving broadcast information (see col 36 lines 14-60 “flow control signal…is sent…..sets the Xon bit in the frame control field at the time it sends the next broadcast frame to all assocated wireless modems”) from at least one neighboring node (see col 36 lines 14-30 "access point") pertaining to the height of at least one queue (see col 36 lines 14-60 “buffer occupancy…. flow control signal…is sent…..sets the Xon bit in the frame control field at the time it sends the next broadcast frame to all assocated wireless modems”) of one neighboring node (see col 36 lines 14-20 "access point") .

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Nakagawa, Muthukrishnan, Bechtolsheim and Sang by using the features, as taught by Chuah, in order to provide a method of efficiently control the timing and making of access requests by remote hosts (see cols 5-6).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENAN CEHIC whose telephone number is (571)270-3120. The examiner can normally be reached on Monday through Friday 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KWANG BIN YAO can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kenan Cehic/
Examiner, Art Unit 2416

/Kwang B. Yao/
Supervisory Patent Examiner, Art Unit 2416